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Influence of music training on language development. A longitudinal study

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Abstract

The aim of this longitudinal study is to determine the effect of formal musical training on language development in 3 to 4 year-old children from a Head Start Program in Puerto Rico. For two years the *Experimental Group* received formal music classes for 20 minutes, three times a week at least. *Control Group* children did not receive formal music classes. The *Child Observation Record* (COR) was used to assess child development and was administered six times during the study. The findings demonstrate that music can make a significant difference in children's language development.

Keywords: Music Training; Language Development; Head Strart Program; Childhood; Longitudinal Study

1. Introduction

Music not only nurtures emotions, but also affects cognitive activities (Patel, 2010), including language processing (Patel & Iversen, 2007). Music education in early childhood is valuable for every child's language skills (Frankling et al., 2008; Wan, Demaine, Zipse, Norton, & Schlaug, 2010). The age at which musical training is started can be a significant factor of this influence (Jentschke & Koelsch, 2009). Because the preschool years are when children take their first critical steps to learning to read and write, music training can be a successful strategy to have a positive impact on these skills (Brown, Benedett, & Armistead, 2010; Herrera, Lorenzo, Defior, Fernández, & Costa-Giomi, 2011).

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Despite all research about the benefits of music in language development for early childhood education, most early childhood programs do not have a staff music educator. In many preschools, the classroom teachers are responsible for conducting musical activities (Nardo, Custodero, Persellin, & Fox, 2006). Therefore, music courses for early childhood and elementary education majors are an essential component of music education (Koops, 2008). However, many teachers lack confidence in their singing skills and therefore avoid using music (Hass, 2010; Heyning, 2011).

The purpose of this study was to investigate the effect of music training on the development of preschool children, especially in the language domain. For it, teachers were trained and mentored by music educators to teach music classes during their scheduled teaching time (only for the *Experimental Group*).

2. Method

2.1. Participants

Participants were a selection of children from a Head Start Program located in Puerto Rico. From the 1482 children that were enrolled in the program, the *Experimental Group* (n = 80) took formal music education classes consecutively for two years, and the *Control Group* (n = 133) did not participate in such classes. The *Experimental Group* was comprised of 42 males and 38 females with a mean age of 42.95 months (SD = 2.62) at the beginning of the study. The *Control Group* was comprised of 63 females and 70 males with a mean age of 42.19 months (SD = 3.63) at the beginning of the data collection period.

2.2. Instruments

To evaluate the performance of the children, the HighScope Spanish Version of the *Children Observation Record* [COR] (HighScope Educational Research Foundation, 2003) was used. It includes 30 preschool development skills from six domains: *Initiative, Social Relations, Creative Representation, Music and Movement, Language,* and *Logical Thinking*. Five statements describing the child's level of behavior are listed under each domain area hierarchically. Teachers are required to take a minimum two-day training to implement this assessment battery. Based upon observations of the child, the observer chooses the statement under each element that best represents the highest level of behavior characteristic of the child.

For the *Experimental Group*, the non-music teachers were trained to teach musical activities using the activity guide "*Despertar Musical* [Musical awakenings]" (García, Hernández-Candelas, & Lugo, 2004), written for use with 3 to 5 year-old children.

2.3. Procedure

For both groups, the COR battery was administered six times throughout the study in the following sequence: Pretest (October), Test 1 (February), Test 2 (May), Test 3 (October), Test 4 (February), and Postest (May).

Early childhood teachers were trained and mentored by music educators to teach music classes during their scheduled teaching time. These classes emphasized the exploration of all music elements through the development of quality musical activities that incorporated singing, playing instruments, improvising and exploring movement.

After training, classroom teachers incorporated music classes into their schedules. The *Experimental Group* students received twenty minutes of music education classes three times a week at least for two years.

3. Results

In order to determine the effects of the musical treatment on children's language, 2-way ANOVAs were conducted for treatment group (variables: Control Group, Experimental Group) for the test time (variables: Pretest, Test 1, Test 2, Test 3, Test 4, Postest) for Language as a domain (see Table 1).

Table 1. Mean (and Standard Deviation) in Groups across Test time for Language

Group	Pretest	Test 1	Test 2	Test 3	Test 4	Postest
Control	2.05	2.39	2.91	2.74	3.33	3.99
	(.59)	(.50)	(.61)	(.56)	(.54)	(.52)
Experimental	1.97	2.64	3.12	2.96	3.61	4.27
	(.39)	(.64)	(.78)	(.72)	(.69)	(.62)

Results showed significant effects for test time, $F(5, 207) = 1036.874$, $p = .000$, $\eta_p^2 = .831$, group $F(1, 211) = 11.761$, $p = .001$, $\eta_p^2 = .053$, and a significant interaction between test time and group $F(7, 418) = 5.276$, $p = .023$, $\eta_p^2 = .024$.

Bonferroni post-hoc contrasts indicated that children's performance for the time of evaluation variable showed statistically significant results for all times except between Test 2 and Test 3, $t = .169$, $p = .074$. Furthermore, significant values were found when comparing the Pretest with Test 1, $t = .505$, $p = .000$, Test 2, $t = 1.008$, $p = .000$, Test 3, $t = .839$, $p = .000$, Test 4, $t = 1.462$, $p = .000$, and the Postest, $t = 2.118$, $p = .000$. Test 1 was different from Test 2, $t = .503$, $p = .000$, Test 3, $t = .334$, $p = .000$, Test 4, $t = .957$, $p = .000$, and the Postest, $t = 1.613$, $p = .000$. Test 2 was different from Test 4, $t = .454$, $p = .000$, and the Postest, $t = 1.110$, $p = .000$. Test 3, was different from Test 4, $t = .622$, $p = .000$, and the Postest, $t = 1.279$, $p = .000$. Lastly, Test 4 was different from Postest, $t = .656$, $p = .000$.

On the other hand, the *Control Group* was different from the *Experimental Group*, $t = .190$, $p = .001$.

4. Discussion

Results indicate that continual formal music education can enhance early childhood language development. Although both the Control and Experimental groups scores on language domain of the COR increased over time, the Experimental Group's scores were consistently higher. These findings are similar to other researchers' studies, which concluded that music could impact other domains of learning (Herholz & Zatorre, 2012; Moreno et al., 2011; Patel & Iversen, 2007; Trainor, Shahin, & Roberts, 2009), and specially language development (Bhide, Power, & Goswami, 2013; Herrera et al., 2011; Jentschke & Koelsch, 2009).

Furthermore, training of teachers for this study addressed making up for their lack of training in music education (Nardo et al., 2006), the need to be trained intensively (Siebenaler, 2006), and the need to increase their level of self-confidence when performed musical activities (Holden & Button, 2006). It could be assumed then, as was found by Koops (2008), that after receiving training and mentoring, teachers gained more understanding of their own musicianship and ability to teach. Therefore, their teaching quality improved over time and consequently, their students' scores increased as they improved their music teaching skills.

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